

# Effect of crop season on the quality and composition of virgin olive oils from Greek and Spanish varieties grown in north-eastern Morocco

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## Abstract

This study aims to evaluate the variations in the quality and composition of virgin olive oils of Spanish (*Arbequina* and *Arbosana*) and Greek (*Koroneiki*) varieties produced in north-eastern Morocco, taking into consideration the influence of crop season. To this end, several parameters were evaluated, such as quality indices, fatty acids, triacylglycerols, minor compounds (phytosterols, phenolic compounds, tocopherols and pigments) and oxidative stability. The results obtained in this study indicate that the majority of the studied parameters, with the exception of phytosterols, are influenced by climatic conditions of the crop season ( $p < 0.05$ ). Additionally, the majority of the studied parameters was also influenced by the cultivar factor ( $p < 0.05$ ). However, the studied varieties produce an excellent oil quality with a chemical composition respecting the requirements recommended by the International Olive Council. The main variations observed on the analyzed olive oils between the crop seasons are those of antioxidant parameters, such as phenolic compounds and oxidative stability. Triacylglycerols and fatty acids are also influenced by the crop season's climatic conditions. Nonetheless, the behavior of the studied varieties towards climatic conditions is different. Furthermore, results of principal component and hierarchical cluster analyses show a good discrimination between varieties according to triacylglycerol, phenol and phytosterol data. These compounds seem to be an effective tool to discriminate between the varieties.

**Keywords:** Crop season, Extra virgin olive oil, Fatty acids, Oxidative stability, Phenolic compounds, Tocopherols, Triacylglycerols.

## Graphical abstract

